

San Francisco Bay Conservation and Development Commission

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TO: All Engineering Criteria Review Board Members

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SUBJECT: US Military Ocean Terminal Concord (MOTCO) Pier 2 Replacement/Upgrade 35% Design Progress Submittal
(For Board consideration on February 26, 2015)

Project Summary

Project Name. US Military Ocean Terminal Concord (MOTCO) Pier 2 Replacement/Upgrade 35% Design Progress Submittal

Applicant. The Department of the Army

Project Representatives. Peter Broderick (USACE Project Manager), Mike Onines (Technical Lead), Malcolm Charles (MOTCO).

Presenters: Carl Schulze, S.E. and Christopher Devick, P.E. (Moffatt & Nichol), Arul Arulmoli, G.E. (EMI).

Project Location and Background. The project site is located in the Bay and within the 100-foot shoreline band in north central Contra Costa County near the City of Concord. MOTCO is bordered by Suisun Bay to the north and the California Department of Fish and Wildlife Point Edith Wildlife Area to the west.

MOTCO is a military munitions and general cargo transshipment facility. It accounts for 72 percent of all Department of Defense (DOD) West Coast ammunition handling capacity. MOTCO has three dual-level piers (Piers 2, 3, and 4) designed for handling non-containerized cargo. Since MOTCO currently accommodates primarily containerized cargo, the current configuration is suboptimal and inefficient. Pier 2 is 70 years old, well past its design and service life, and has been inoperable since 2008. The proposed project would replace the pier's dual level configuration with a single-level deck, and numerous other pier-side and landside improvements would be made. If Pier 2 is not repaired and modernized, the Army has stated that the DOD's ability to perform its current and future contingency operations in the Pacific theater would be impacted.

Project Summary. The purpose of this project is to construct a replacement pier to support containerized operations at MOTCO. The replacement Pier 2 will be used by the Department of the Army to meet ammunition throughput requirement on the west coast. The project includes the design and construction of a new concrete pier with a main platform, approach trestles, and operations building. The project would also involve the demolition of the existing timber pier, the repair of sections of a connecting trestle and road, upgrading utilities, the repair and replacement of pier-side supporting facilities, the installation of waterside security bollards and

lighting, the installation of a drainage system and treatment device for surface runoff, placement of 115 feet of riprap, a small amount of dredging, and the removal of any munition and explosive remnants from the 1944 Port Chicago Disaster.

Prior to starting construction work on Pier 2, the Army will search for and remove any explosive materials remaining from the 1944 Port Chicago Disaster.

Project Elements.

Demolition Activities: the project would involve (1) demolishing 159,000 square feet (sf) (3.65 acres) of pier structure, including the main Pier 2 platform, west trestle, mid-pier trestle and forklift trestle, (2) removing 4,514 creosote-treated timber piles, or cutting them two feet below the mudline in cases where removal is not required or possible, (3) removing 254 concrete square piles, 1,300 cubic yards of concrete slab, 200 tons of reinforcing steel, 1,550 timber pile cap beams, 112,500 feet of stringers, 13,500 decking boards, 1,895 cubic yards of asphalt, and (4) removing various other components including utility hangers, steel fasteners, sprinklers, risers, fender frames and floats, hose connections, circuit breakers, and electrical cables, all removed material to be reused, recycled or disposed of at an authorized upland location outside the Commission's jurisdiction.

Construction Activities: the project would involve (1) constructing a single-level, 95,000 sf (2.18 acre) pier that extends 48 feet further offshore and into deeper water than the existing pier, including driving 876 new 24-inch pre-stressed concrete piles and 125 reused square concrete fender piles and installing 2,000 feet of new crane rails, and adding two 80-long ton capacity container cranes, (2) constructing a new 21,347-square-foot (0.49 acre) west trestle, (3) constructing a new 6,868-square-foot (0.16 acre) forklift trestle, and (4) placing up to nine feet of fill for shoreline approaches from White Road including revetments for the new west trestle and forklift trestle abutments.

Structural Repair on the East Trestle: The project will involve (1) demolishing the existing precast deck slabs over 2 spans adjoining the main pier, and (2) replacing with new precast deck slabs to form an access ramp between the existing trestle and the elevation of the new Pier 2.

Additional Work Activities: the project will also involve rock revetment around the abutments of the new West Trestle and the Personnel/Forklift Trestle approaches. Portions of White Road adjoining the new pier that have subsided over the years by as much as 3 feet will be restored to their former grade to prevent flooding under the 100 year high water event.

The work as described represents a 35 percent design criteria. The expected life of the structure is 50 years or to 2068 with an anticipated project completion date of 2018.

Law and Policy Considerations. The *McAteer-Petris Act*, the law that created the Commission, allows the Commission to approve fill¹ only when public benefits from fill clearly exceed public detriment from the loss of the water areas and only for water-oriented uses (Section 66605). Further, fill must meet certain specific criteria, including that the fill be constructed "in accordance with sound safety standards which will afford reasonable protection to persons and

property against the hazards of unstable geologic or soil conditions or of flood or storm waters" (Section 66605(e)) and that that the fill should be the "minimum necessary to achieve the purpose of the fill" (Section 66605(c)).

The project consists of the replacement of a structure used solely for water-oriented uses in the Bay. A small amount of riprap is proposed around the abutments of the West and the Forklift trestles. Within the 100-foot shoreline band, the Army proposes to increase the inland grade of the pier approaches to meet the grade of the new Pier 2. The grade of subsided portions of White Road would be restored.

Additionally, in order to carry out its responsibility, the Commission adopted policies in the San Francisco Bay Plan regarding the safety of fills, shoreline protection and climate change, which include the following:

San Francisco Bay Plan on the Safety of Fills

1. Policy No. 1 states, in part, that "the Commission has appointed and empowered the ECRB to:
 - (a) ... review safety criteria for Bay fills and structures thereon;
 - (b) review all except minor projects for the adequacy of their specific safety provisions, and make recommendations concerning these provisions;..."
2. Policy No. 2 states that "even if the Bay Plan indicates that a fill may be permissible, no fill or building should be constructed if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the ECRB."
3. Policy No. 3 states that "to provide vitally-needed information on the effects of earthquakes on all kinds of soils, installation of strong-motion seismographs should be required on all future major land fills. In addition, the Commission encourages installation of strong-motion seismographs in other developments on problem soils, and in other areas recommended by the U. S. Geological Survey, for purposes of data comparison and evaluation. "
4. Policy No. 4 states that "[a]dequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project. The Commission may approve fill that is needed to provide flood protection for existing projects and uses. New projects on fill or near the shoreline should either be,
 - set back from the edge of the shore so that the project will not be subject to dynamic wave energy,
 - be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project,

be specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future SLR and storm activity.”

San Francisco Bay Plan on Shoreline Protection

1. Policy No. 1 states that “[n]ew shoreline protection projects and the maintenance or reconstruction of existing projects and uses should be authorized if:
 - (a) the project is necessary to provide flood or erosion protection for
 - (i) existing development, use or infrastructure, or
 - (ii) proposed development, use or infrastructure that is consistent with other Bay Plan policies;
 - (b) the type of the protective structure is appropriate for the project site, the uses to be protected, and the erosion and flooding conditions at the site;
 - (c) the project is properly engineered to provide erosion control and flood protection for the expected life of the project based on a 100-year flood event that takes future sea level rise into account;
 - (d) the project is properly designed and constructed to prevent significant impediments to physical and visual public access; and
 - (e) the protection is integrated with current or planned adjacent shoreline protection measures. Professionals knowledgeable of the Commission’s concerns, such as civil engineers experienced in coastal processes, should participate in the design.”

San Francisco Bay Plan on Climate Change

1. Policy No. 2 states that “When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared by a qualified engineer and should be based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection that will be funded and constructed when needed to provide protection for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment. Inundation maps used for the risk assessment should be prepared under the direction of a qualified engineer. The risk assessment should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices.”
2. Policy No. 3 states, in part, that “To protect public safety and ecosystem services, within areas that a risk assessment determines are vulnerable to future shoreline flooding that threatens public safety, all projects should be designed to be resilient to a mid-century sea level rise projection. If it is likely the project will remain in place longer than mid-

century, an adaptive management plan should be developed to address the long-term impacts that will arise based on a risk assessment using the best available science-based projection for sea level rise at the end of the century.”

3. Policy No. 5 states that “Wherever feasible and appropriate, effective, innovative sea level rise adaptation approaches should be encouraged.”

ECRB Advisory Role. BCDC seeks advice from the ECRB with respect to the proposed project’s engineering criteria in light of BCDC’s law and policies. Digital copies of the reference engineering material is included on a CD enclosed:

1. **Seismic, Structural and Geotechnical Concerns.**

- a. **Structures over waters of the Bay.** *Are the proposed engineering analysis and criteria suitable for this site? Are the engineering criteria of the new structures, e.g., the Forklift and West trestles and Pier 2 Main Platform sufficient to overcome the physical hazards specific to the site? Does the engineering strategy, including the structural repair of the East Trestle, provide sound safety standards that will afford reasonable protection to people and property against the hazards of unstable geologic or soil conditions or of flood or storm water?*
- b. **Geotechnical and geological concerns.** *Dredging of the channel will be part of the project’s on-going maintenance. Further, portions of the landside (White Road) next to the new pier have subsided by as much as three feet.; Does the proposed project address all the known geotechnical/geological concerns of the site, e.g., impacts to proposed structures from liquefaction-induced lateral spreading or settlement, pile vulnerabilities from deep channel trenching, other soil hazards?*
- c. **Other issues.** *The area of project would need to be cleared of any Munitions and Explosives of Concern (MEC) prior to construction activities as a result of the Port Chicago Catastrophe of 1944.*

2. **Sea Level Rise and Flooding Concerns.** Sea level rise information has been provided in the revised Sea level rise memorandum dated Feb 9 2015 by M&N.

- a. **Sea Level Rise Projections.** *BCDC recommends using NRC 2012 (Low/Projected/High) values as the basis for sea level rise projections. The reference information regarding BCDC values used in the Army’s sea level rise projections is outdated (2011). Although a risk assessment has not been provided, the project proponents used 36 inches of SLR above a 100-year storm event (BFE) with an additional 24 inches of freeboard as a target to determine the elevation of the new fixed deck elevations, including the West and Forklift trestles. The elevation of the East Trestle would remain at existing grade due to the reuse of the structure. The crane lift height and pier mooring/fendering systems were based on 22 inches of sea level rise over the 100-year storm event since these items could be adjusted vertically to meet the potentially higher sea level elevations. The proposed new deck elevations would be at +13.5 feet MLLW whereas the East Trestle structure deck would be at +11.5 feet*

MLLW. The SLR projection (36 inches), including BFE, for the life of the project (year 2068) is +11.5 feet MLLW. Therefore, no freeboard might exist on the East Trestle when periodic overtopping may become more frequent.

Are adequate measures included in the design of the structure to prevent damage from SLR and storm activity over the expected life of the project? Would the project be built so the bottom floor level of structure be above 100-year flood elevations and SLR projections for the expected life of the project? If not, has the project been specifically designed to tolerate periodic flooding in conformance with Policy No. 4 of the Safety of Fills?

- b. **Adaptation Strategy.** *The project has not presented an adaptation strategy for the duration of the project after mid-century.*

Because no Monitoring and Adaptive Management strategy has been proposed, could there be negative potential long-term impacts on navigation, water quality, currents and waves from a derelict project in the Bay if the structure cannot be easily adapted.

Enclosed Material

1. US Army Corps of Engineers Design Replace/Upgrade Pier 2, MOTCO Supplemental Reports.
 - a. Amended Sea Level Rise Study (09 February 2015).
 - b. Geotechnical Data Report (15 January 2015).
 - c. Site-Specific Ground Motion (19 January 2015).
2. US Army Corps of Engineers Replace/Upgrade Pier 2, MOTCO 35% Design Drawings (2015-01-02).
3. Digital Copy of US Army Corps of Engineers MOTCO Design Analysis Report (2015-01-02).
4. Digital copies of all the information above on CD.